CARDIOSPASM

SUCCESSFULLY TREATED BY HYDROSTATIC DILATATION

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DISCUSSION *by William J. Kerr, M.D., San Francisco, and William Dock, M.D., San Francisco.*

CARDIOSPASM, or spasm of the lower end of the esophagus, is a well-recognized clinical pathologic entity. The obstruction is intermittent at first and results in gradual distention of the esophagus. In advanced cases obstruction may be continuous and almost complete. Dysphagia and substernal pain are prominent symptoms.

Treatment consists of forceful dilatation of the spastic area. Different means have been employed to accomplish this. A satisfactory method is hydrostatic dilatation with the Plummer dilator.

In reviewing the histories of patients with cardiospasm seen at Stanford Clinic and in private practice, it is apparent that previous treatments, such as the administration of antispasmodic drugs and the passing of bougies, have given unsatisfactory results. The following cases are presented to illustrate the good results obtained by forceful dilatation of the spastic area.

REPORT OF CASES

CASE 1.—No. 104849. Female. Age, 57. Six years ago the patient was suddenly seized with a gagging and choking sensation after eating. Following this she had periodic attacks of difficulty in swallowing both liquids and solids. She did not vomit food, but regurgitated considerable saliva and mucus. The food seemed to stick under the lower end of the sternum. X-ray showed tremendous dilation of the esophagus due to cardiospasm. She had lost forty pounds within the six months previous to examination. The Wassermann reaction was negative. Other laboratory examinations were of no significance.

Following hydrostatic dilatation she was completely relieved of her symptoms, and x-ray showed the esophagus to empty rapidly.

Two months after dilatation the patient remained relieved of her symptoms. She has not been heard from since.

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CASE 2.—No. A9613. Female. Age, 27. A year ago the patient began to have attacks of pain in the epigastrium, coming on usually at night. For two months previous to examination she had difficulty in retaining food, even when taken in small amounts, regurgitating both liquids and solids. Occasionally after eating she had a sensation of the stricture opening up and allowing food to pass through. She lost twenty-seven pounds during this period. X-ray showed a spasm of the cardia with a small amount of barium retained in the esophagus after six hours (Fig. 1). Other laboratory examinations, including the Wassermann test, were negative.

Following hydrostatic dilatation she reported that she had occasional slight substernal pain early in the morning, but she had no difficulty in swallowing and did not regurgitate.

Two and one-half years later the patient reports that while she has been very much improved, occasionally she still has a little difficulty in swallowing. She has gained eleven pounds since dilatation.

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CASE 3.—No. A11660. Female. Age, 39. For a period of four months the patient had increasing difficulty in retaining food. At the time of examination apparently nothing she ate was retained, and she lost fifty pounds in weight. The x-ray diagnosis was cardiospasm. The hemoglobin test showed 66 per cent; otherwise the laboratory findings were negative.

The passage of a No. 60 French olive failed to give relief, so hydrostatic dilatation was done. She complained of considerable soreness over the lower part of her chest following this procedure, and developed a patch of pneumonia in the lower left lobe with possible mediastinal effusion. This complication may have been due to a slight splitting of the esophagus as a result of the dilatation. She made a quick recovery, has regained her normal weight and has been entirely cured of her dysphagia. When last heard from, two and one-half years after the treatment, she had no recurrence of her former symptoms.

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CASE 4.—No. A19329. Male. Age, 48. A year previous to our examination this patient's trouble began with a feeling of fullness in the epigastrium. For a period of five or six months he had been vomiting at night shortly after going to bed. These symptoms gradually grew worse. The x-ray showed spasm of the lower end of the esophagus (Fig. 2). Laboratory findings, including a Wassermann test, were negative.

Following hydrostatic dilatation, the patient was completely relieved of his symptoms and has remained so for a period of a year and a half. He has no difficulty whatever in swallowing, and feels very well.

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CASE 5.—No. 177949. Female. Age, 60. The patient's complaint was difficulty, for a period of six years, in swallowing. She had lost 100 pounds in weight. Two and a half years previous to examination, a diagnosis of inoperable cancer of the esophagus was made elsewhere.

She had a marked secondary anemia—hemoglobin, 68 per cent, red blood cells, 3,600,000. The x-ray's diagnosis was cardiospasm (Fig. 3).

An abdominal exploration was done, and the cardiac end of the stomach and lower end of the esophagus were found to be surrounded by adhesions, which were freed. Following this operation the patient continued to regurgitate practically everything she ate. Two weeks later hydrostatic dilatation was done, and she was entirely relieved of her dysphagia. She gained eleven and a half pounds during the following six months.

She writes, two and a half years following dilatation, that she does not feel well and that she regurgitates her food occasionally. She has numerous complaints not related to the gastro-intestinal tract.

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CASE 6.—No. A5594. Female. Age, 26. About a year ago the patient began to experience a feeling of weight in the epigastrium, which appeared about twenty minutes after eating and was frequently followed by regurgitation of ingested food. She had no pain.

A diagnosis of cardiospasm was made and the spastic area was dilated elsewhere by means of an air-filled balloon. She did not obtain relief from this procedure. Following hydrostatic dilatation, she was completely relieved of all her symptoms.

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CASE 7.—No. 197595. Female. Age, 33. The patient entered the clinic complaining of cough, fever, and loss of weight. A diagnosis of active pulmonary tuberculosis was made. In addition, she complained of difficulty in swallowing and, for a period of six years, frequent regurgitation of undigested food. The x-ray revealed a spasm of the cardiac end of the esophagus (Fig. 4). Sputum showed tuberculosis bacilli. Other laboratory examinations, including Wassermann test, were negative.

Hydrostatic dilatation was followed by complete relief of the dysphagia. Marked improvement in the pulmonary condition also followed after treatment in a sanitarium. At the present time, three and a half years later, the patient reports that she is in good health, has gained twenty-two pounds, but still has some slight difficulty in swallowing if she takes solid food in large amounts.

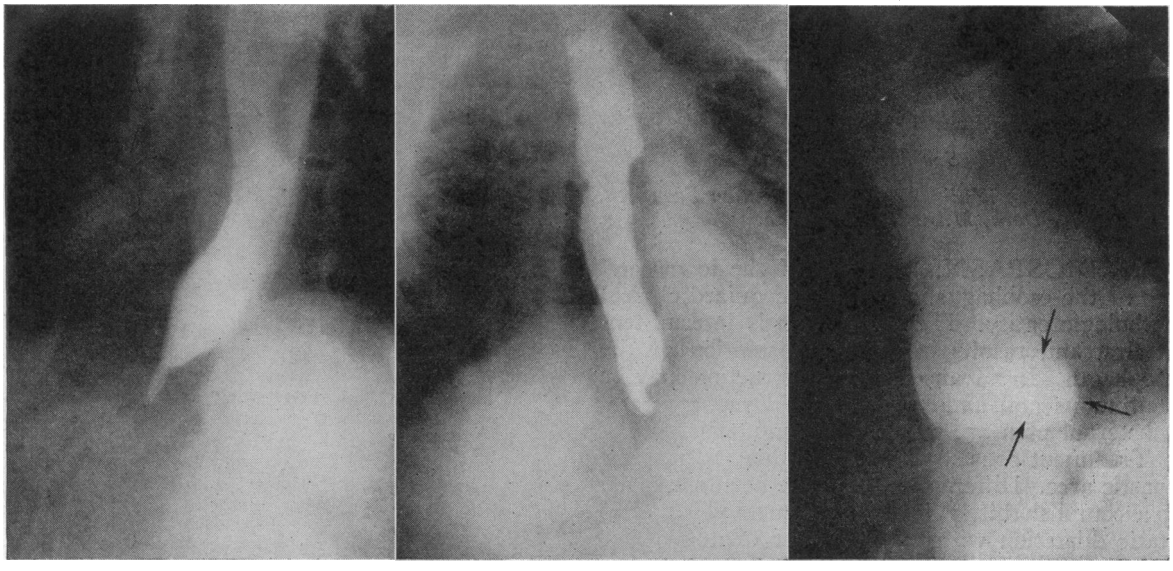

Fig. 1 Fig. 2 Fig. 3

Fig. 1.—Cardiospasm showing typical cone-shaped dilatation of the esophagus above the spastic area.
Fig. 2.—Cardiospasm. Atypical x-ray picture difficult to differentiate from cancer of the cardia.
Fig. 3.—Cardiospasm with markedly dilated and tortuous esophagus.

CASE 8.—E. O. M. Male. Age, 48. Intermittent dysphagia over a period of four years was the patient's complaint. Liquids and solids appeared to stick under the lower end of the sternum; and in order to aid their passage he had formed a habit of standing while eating and forcing the food down with vigorous swallowing movements. An attempt had been made elsewhere to dilate the spastic area with the Plummer dilator, but he obtained no relief. Apparently the dilator had not been properly placed, as the patient suffered no pain while the bag was being distended up to 26 feet of water pressure. This patient also had a complicating pulmonary tuberculosis.

Following hydrostatic dilatation, he was completely relieved of his dysphagia. After a period of five months he still has no difficulty in swallowing.

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CASE 9.—No. A36257. Male. Age, 40. This patient's complaint was intermittent dysphagia of five years' duration. Solids and cold liquids caused the most trouble, and appeared to stick in the epigastrium. While his food was thus lodged he had severe cramps under the sternum. He obtained relief by vomiting or taking warm liquids. The x-ray showed a cardiospasm with 25 per cent residue in the esophagus after six hours. He was dilated with a 45 French olive followed by a 60 French olive, and entirely relieved of his dysphagia. Four months have elapsed since this was done, and should his symptoms return, hydrostatic dilatation will be done.

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CASE 10.—E. T. Female. Age, 21. For the past two years ingested food, both liquid and solid, appeared to lodge for a time in the lower end of the esophagus. This patient had considerable epigastric pain. The x-ray showed cardiospasm.

Following hydrostatic dilatation the food passed freely into the stomach, pain ceased, and she gained ten pounds in weight. She had no return of symptoms a year after dilatation.

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CASE 11.—S. C. Male. Age, 23. Beginning seven years ago this patient commenced to have intermittent attacks of difficulty in eating. Liquids and solids lodged in the lower end of the esophagus, and caused considerable pain. Later his symptoms were more constant and gradually increased in severity. Small amounts of food eventually passed through, but large quantities were regurgitated.

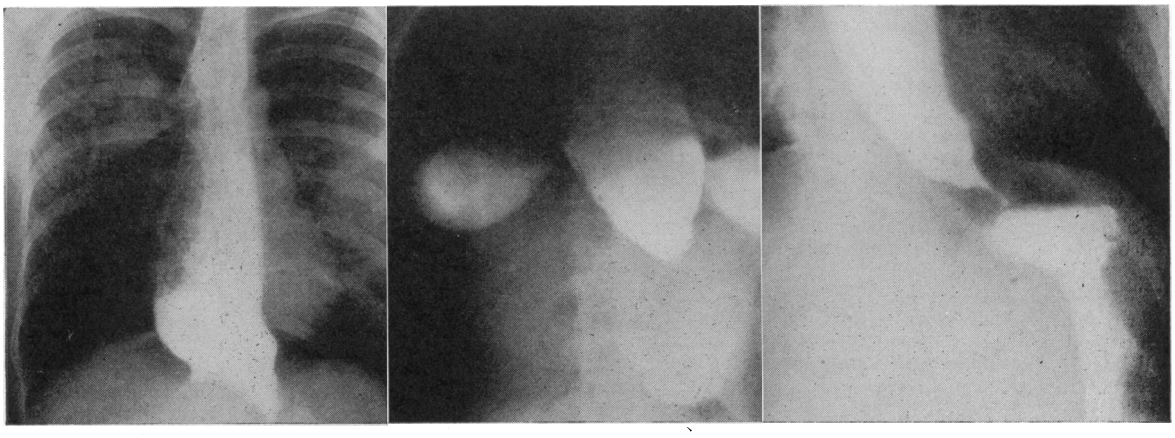

Fig. 4 Fig. 5 Fig. 6

Fig. 4.—Cardiospasm with tortuous and dilated esophagus and pulmonary tuberculosis.
Fig. 5.—Cardiospasm with marked dilatation of the esophagus.
Fig. 6.—Cardiospasm with some barium passing into the stomach.

Several physicians were consulted at different times, all of whom made the diagnosis of cardiospasm, but none of whom was able to give him any relief.

It is now six years since hydrostatic dilatation was done. He was immediately relieved of his symptoms, and has had no recurrence of his trouble. He has gained fifty pounds in weight.

CASE 12.—H. D. Female. Age, 28. The patient had had intermittent difficulty in swallowing both liquids and solids for a period of eleven years. Her trouble had been gradually growing worse, and six months previous to examination she took chloroform liniment with suicidal intent. Prompt attention saved her. The x-ray showed a spastic cardia and dilated esophagus (Fig. 5). Complete relief from symptoms followed hydrostatic dilatation.

CASE 13.—T. J. D. Female. Age, 25. For three and one-half years the patient had difficulty in swallowing liquid and solid food. At the onset this condition had been intermittent, but for fourteen months previous to examination it had become constant. Pain became an increasingly severe symptom. The x-ray showed a cardiospasm (Fig. 6). An attempt to dilate the spastic area by esophagoscopy was unsuccessful on two occasions.

Dysphagia has been entirely cured following hydrostatic dilatation. She recently complained of some discomfort after meals, but this has been relieved by a little care in the selection of her food, something which had not appealed to her after so long a period of dysphagia.

CASE 14.—M. G. Female. Age, 23. The patient for a year complained of difficulty in swallowing. The onset was quite sudden, with the lodging of food under the lower end of the sternum. Liquids caused as much difficulty as solids. She lost twenty-five pounds in weight during the year. A number of physicians were consulted, but no relief was obtained.

The x-ray showed cardiospasm, with considerable dilatation of the esophagus.

Dilatation was done up to fifteen pounds of water pressure, but this gave only temporary relief. A second dilatation was done a month later and the pressure used increased to twenty-five pounds. This has given complete relief, and she has gained thirty pounds in weight. It is fifteen months since the second dilatation.

CASE 15.—J. M. Female. Age, 30. This patient complained of difficulty in swallowing since childhood. Pain under the sternum was a distressing symptom. She had been dilated with bougies several times, but had been little relieved. The x-ray showed a typical cardiospasm. The spastic area was dilated with a size 60 French olive.

The patient has been relieved of her dysphagia, but will probably require hydrostatic dilatation at a later date.

SUMMARY OF CASES

The histories of fifteen patients with cardiospasm have been reviewed. Eleven patients were women and four were men. The oldest patient was sixty years of age, the youngest twenty-one years of age, the average age being thirty-five years. The average duration of symptoms was five years. Thirteen patients were treated by hydrostatic dilatation; two were dilated with a size 60 French olive. Twelve patients have remained cured over periods ranging from several months to over six years. The other three patients were greatly relieved of their symptoms, but still complained of slight dysphagia at times.

MEDICAL TREATMENT OF CARDIOSPASM

Mild cases of cardiospasm without x-ray evidence of delay in emptying the esophagus may be successfully treated by medical means. An illustrative case follows:

No. A24968. Female. Age, 60. The patient complained of spells of nausea and vomiting for the past seventeen months. During attacks she experienced a sense of constriction under the lower end of the sternum. The x-ray showed a normal esophagus. The diagnosis was mild cardiospasm. The patient was given tincture of belladonna and elixir of sodium bromid, and two months afterward she reported that she was much improved and had very little difficulty in swallowing.

SURGICAL TREATMENT OF CARDIOSPASM

In a very occasional patient simple dilatation cannot be done and surgery is indicated. Doctor Judd and I have reported such a case. In this patient the esophagus was so dilated and tortuous that, while the thread was successfully swallowed, it was, nevertheless, impossible to pass sounds without great danger of injuring the esophagus. A gastrostomy was done, and the cardia dilated manually from below. The patient was much improved following this, but not entirely cured. Some months later hydrostatic dilatation was successfully done.

Plastic operations have been done on the cardia, but they have not been uniformly successful and the mortality is quite high. Hydrostatic dilatation in most cases is simpler, more satisfactory and much less risky than operative procedures.

INCIDENCE OF CARDIOSPASM

Cardiospasm is considered quite rare, but I believe that mild forms of it are more common than is generally thought. Temporary spasm of the cardia has undoubtedly been experienced by large numbers of individuals. Almost everyone has at times had severe substernal pain on gulping some cold liquid when he was hot and tired. This is a temporary cardiospasm and in most individuals the discomfort suffered is sufficient warning to prevent a repetition of its cause.

Cardiospasm occurs most frequently in relatively young women. It may be associated with other lesions, notably cholecystic disease and peptic ulcer, but usually it exists alone. Though a definite etiology has not been established, it is considered to be of nervous origin. The condition, however, is definitely not a neurosis, but a true organic lesion.

DIAGNOSIS

The majority of patients with cardiospasm give a history of periodic spells of difficulty in swallowing lasting over a period of years. In the early stages the spasm is intermittent, and there may be long periods of freedom from trouble. Gradually, however, the spasms occur with more frequency, and finally the patient is unable to take any type of food in comfort. In the beginning liquids, especially cold liquids, often cause more trouble than solid foods. In the later stages solid foods also give trouble. The patients usually describe the ingested food as sticking or lodging under the lower end of the sternum. They adopt various procedures to force the food through.

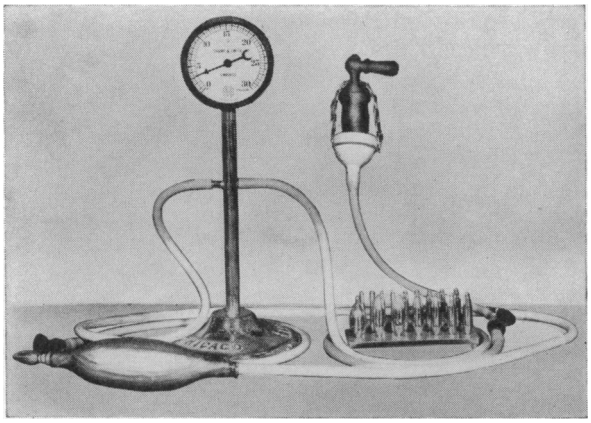

Fig. 7.—Plummer hydrostatic dilator.

Some obtain relief by standing and drinking large quantities of fluids, forcing the spasm by means of pressure from above. Others, by closing the glottis, seem to be able to compress the esophagus by means of increased intrathoracic pressure and thus force the food through the constricted area. Still others find that they can eat only small amounts at a time and, following varying intervals, the spasm temporarily releases itself. To obtain relief, almost all the patients in advanced cases regurgitate a certain amount of the food taken.

In spite of difficulty in swallowing, many of these patients go on for years without any great loss of weight or strength, while some become markedly emaciated and anemic.

The condition has to be differentiated from cancer of the esophagus and benign organic stricture. The long history, its intermittency in the early stages, and the characteristic x-ray appearance differentiate cardiospasm from cancer. However, in two of my patients a previous diagnosis of cancer had been made. Organic stricture can also be differentiated on the basis of the history and x-ray appearance.

PATHOLOGY

The spasm occurs usually in the esophagus above the cardia at the level of the esophageal hiatus of the diaphragm. The esophagus becomes gradually dilated above this point. The dilatation may be two or three times the normal diameter of the esophagus, and in some instances the saculated esophagus appears by x-ray to take up as much as a third of the available space in the thoracic cavity.

Pathologic examination in such cases shows the wall of the esophagus to be greatly thickened, and firm at the point of narrowing, while above, in the dilated area, the musculature is more or less hypertrophied, but shows no other marked changes. Usually in advanced cases there is some evidence of inflammatory reaction. There may be small superficial mucosal ulcers present, but these appear to be secondary to the spasm and not a cause of it. So-called peptic ulcers in the lower end of the esophagus occasionally occur, and may produce a certain amount of spasm; but such cases are not included in this group.

TREATMENT

Cardiospasm is treated by forcefully dilating the constricted area. The method used in this series was that of hydrostatic dilatation by means of the Plummer bag, with a previously swallowed silk thread as a guide (Fig. 7). This is the method described by Plummer and Vinson. The procedure is as follows:

The patient is first instructed to swallow five to eight yards of silk thread. The purpose of the thread is to furnish a guide for the passage of sounds and dilator. It is an absolutely essential part of the procedure, in that it inevitably guides the instrument to the proper opening, and prevents the possibility of forcing the dilator into a false pocket and thus rupturing the esophagus. A glance at some of the x-rays in these cases shows that the esophagus at times turns almost at right angles before entering the stomach, and illustrates how easily an independently passed sound might perforate it (Figs. 3 and 4). A spool of buttonhole silk, size "D," is satisfactory, and is easily obtained. The first few feet are swallowed slowly so that the end of the thread may find its way through the point of spasm. After this it may be swallowed a little more rapidly until it passes through the stomach and into the intestines. When this has occurred, it is drawn down by the peristaltic action of the intestines and soon becomes firmly anchored. It is advisable to tell the patient to fasten or hold the thread while eating so that too much is not taken in at a time, which might result in the thread becoming snarled. From twenty-four to thirty-six hours is the usual time required for the thread to become sufficiently well anchored to serve as a guide for the passage of sounds. Patients frequently protest in the beginning that they will be unable to swallow the thread, but when properly coaxed they never fail to do so, and it always passes through even the smallest stricture.

Before dilating, the esophagus should be empty to prevent regurgitation and possible pulmonary complications, as a result of the passage of regurgitated material into the trachea during instrumentation.

The patient is placed in a low chair with a curved seat, designed to prevent his slipping forward during the passage of the instruments. The dilatation is done without anesthesia, because one of the determining points as to whether the dilator has been properly placed or not is the pain which the patient has at the time of dilatation.

A No. 45 French olive, with a filiform tip, is first fastened to a whalebone staff and guided into the esophagus over the previously swallowed thread which must be held taut during this procedure. At the point of spasm, a resistance to its passage is felt; but with moderate pressure this is overcome and the dilator slips through into the stomach. This procedure confirms the diagnosis of spasm as against an organic stricture, which is unyielding and does not permit the passage of so large a dilator. The distance of the strictures from the patient's incisor teeth is marked off on the whalebone staff. This distance is now meas-

ured off on the hydrostatic dilator and it is passed in a similar manner over the thread. When the dilator is in the correct position, the water is turned on and the pressure in the bag is increased up to the desired point by compressing the outlet tube. As soon as the gauge registers the desired pressure, usually from 15 to 20, the water is released and the bag removed. The thread is cut off close to the patient's mouth and the remainder swallowed.

RESULTS OF TREATMENT

In nearly all my cases a single dilatation has been successful. In two patients two dilatations were necessary. In one instance the patient developed a pulmonary lesion, which may have been the result of a slight splitting of the esophagus or an aspiration pneumonia. The patient recovered after a brief illness. In two patients the hydrostatic dilator was not used, but a size 60 French olive was used in its stead. These patients also obtained complete relief.

Patients usually complain of a little soreness under the lower end of the sternum after treatment, but this passes off after a day or two. The spasm is relieved immediately, and the patients are able to eat a large meal without difficulty a few hours after the procedure.

CONCLUSION

The results following hydrostatic dilatation of cardiospasm are so gratifying to both patient and doctor that it seems worth while to again call attention to this fact.

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DISCUSSION

WILLIAM J. KERR, M.D. (University of California Hospital, San Francisco).—It has given me a great deal of pleasure to read Doctor Nagel's instructive paper on "Cardiospasm." There is not much doubt that most of the patients described by Doctor Nagel, in reporting his experience in fifteen cases, have reached the stage where forceful dilatation of the cardiac sphincter is perhaps necessary in their treatment. The condition is somewhat analogous to the pylorospasm occurring in infants, where the tissue becomes extremely rigid and would remain permanently so unless some mechanical measures were employed to relieve it. In my opinion, these two conditions are examples of structural change which results from long-standing functional disturbance.

If one can recognize patients who have a tendency to cardiospasm, and can approach them from the standpoint of functional disturbance, going into their psychological problems and treating them first in an attempt to remove the cause of their trouble or to make the situation in which they find themselves comprehensible to them as a cause for their symptoms, I am sure that a good deal can be done to prevent the later stages which Doctor Nagel rightfully suggests should be treated by forceful dilatation. It may be necessary to make use of sedatives and antispasmodic drugs, and to treat the autonomic nervous system either on the parasympathetic or, perhaps, on the sympathetic side; but this must be handled in an individual manner on the patients as they present themselves. If one follows the directions which have been given by the author, there is very little probability of injury to the tissues around the lower end of the esophagus, and one is not likely to have mediastinitis or other local infections arise following trauma to the tissues and perhaps extension of infection from the lumen of the esophagus or stomach.

WILLIAM DOCK, M.D. (Stanford University Hospital, San Francisco).—The treatment of cardiospasm by forceful dilatation, with a dilator of large caliber, is one of the most satisfactory therapeutic procedures in all medicine, as those of us who have followed Doctor Nagel's cases, or cases similarly treated elsewhere, are well aware. While the treatment must be used with strict care as to its details, and preferably only after much experience in assisting at the operation, the actual discomfort and risk to the patient are not great enough to justify other forms of therapy except under unusual circumstances. Mild cases unable to obtain such therapy may be controlled by allowing them to pass a mercury-weighted Ewald tube before and after meals, as described by Arthur Hurst in 1924, and very long-standing cases with tortuous gullets may require gastrostomy, retrograde dilatation and other procedures; but the majority of instances met with in practice are best managed by the technique described here. It should be noted that the disturbance affects the lower esophagus, and is due to its failure to relax as the peristaltic wave comes down. A tube passes through easily, and is not gripped as the spastic anal sphincter grips the examining finger. But only forceful overdilatation can be relied on to give more than transient relief.

THE LURE OF MEDICAL HISTORY†

MEDICAL CONDITIONS, PRACTICES, AND FOUNDATIONS IN THE CONTINENTAL COLONIES*

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PART II‡

INDIAN CONTRIBUTIONS

HOWEVER, Governor Winthrop's son, J. Winthrop, Jr., copied some worth while things from his red-skinned friends. A short discussion of these will indicate the contributions of the Indians. Doctor Winthrop praised their use of tobacco, saying, "The juice of the green leaf healeth green wounds, although poysened" (Packard). The juice referred to by Winthrop contains nicotin, which acts as an antiseptic, but, if used too liberally, as a strong poison. Winthrop adopted this remedy for his formulary. The Indians, like the colonists, knew about cauterizing wounds to prevent infection. The Indians used cauterization in a very novel way to keep prisoners from running away. Winthrop states that the Indians cut away half of a prisoner's foot, then took the skin and wrapped it over the wound and cauterized it, thus preventing the prisoner from running because he had only half a foot. The Indians also knew about cascara, a drug official in modern pharmacopeias, and used it both for painting themselves and as an emetic for the sick.

However, the Indians were worse off than the colonists when it came to epidemics. An old English writer states, "They (Indians) were also

†A Twenty-Five Years Ago column, made up of excerpts from the official journal of the California Medical Association of twenty-five years ago, is printed in each issue of CALIFORNIA AND WESTERN MEDICINE. The column is one of the regular features of the Miscellany department, and its page number will be found on the front cover.

* Second award in an essay contest of The Colonial Dames, December 1, 1935.

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‡ Part I of this paper was printed in the August issue (on page 169).